

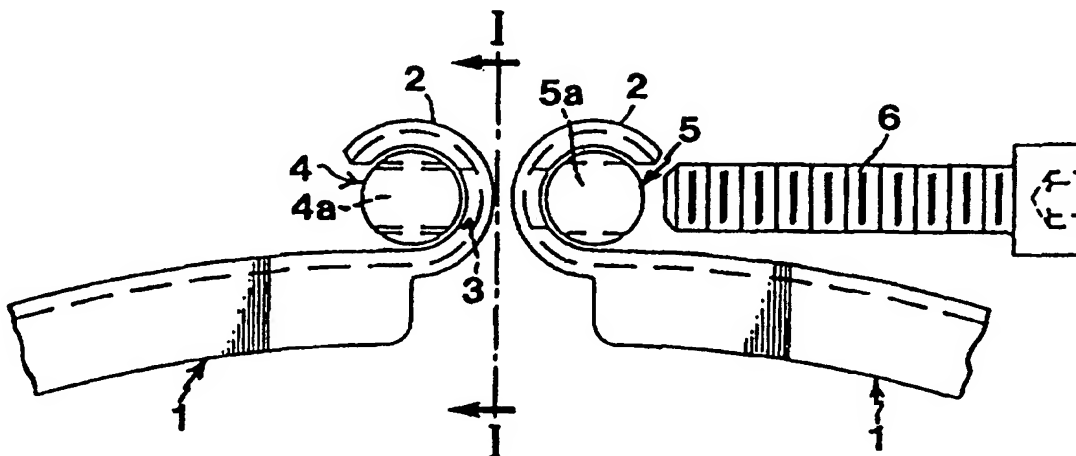
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(54) Title: DEVICE FOR COUPLING PIPE SECTIONS



(57) Abstract

A device for coupling two pipe sections comprises a clamping band (1) of U-shaped cross section with two inwardly directed flanges for encompassing end beads of the pipe sections which are to be coupled. The ends of the clamping band (1) have cylindrical pockets (2) each accommodating a cylindrical element (4, 5) which is rotatable about its own axis in the pocket. The clamping band is clamped by means of a threaded screw (6) which is passed through an unthreaded hole (5a) in one cylindrical element and unthreaded holes (3) in the ends of the clamping band, whereupon the screw finally is in threaded engagement with the other cylindrical element (4).

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DEVICE FOR COUPLING PIPE SECTIONS

The present invention relates to a device for coupling pipe sections whose one end has an outwardly directed bead or a plurality of projections positioned along the circumference. More specifically, the invention relates to a device of the type defined in the preamble of claim 1. Pipe sections, to which the invention is applicable, are shown in, for instance, Danish Design Registration MR 0508/89.

The invention is particularly directed to a device with a clamping band of the type which preferably is used for the coupling of pipes of thin metal sheet, of which the front ends have flanges or outwardly directed beads, such as spiral-fold ventilating pipes and grain conveying pipes, or for the clamping of, for instance, end covers on electric motors or the like.

Prior-art clamping bands of this type are usually fitted with a clamping device, which can consist of, for instance, a handle with a wire or leaf spring (snap lock), the handle and the spring being directly integrated with the clamping band by bending or like operation, or attached by means of mountings which are mounted on the band by riveting or welding.

There are also prior-art clamping bands whose ends are bent perpendicularly away from the band and formed with through holes, the band being clamped by a screw being passed through the outwardly bent ends and a preferably square nut being put on the screw, whereupon the screw and the nut are clamped, thereby moving the ends of the clamping band together.

These prior-art devices are, however, provided with rather complicated clamping mechanisms. Usually, the abutment means cooperating with the straining screw are specially designed and positioned in specially constructed spaces or pockets which are defined by flanges of the clamping band. For instance, the pockets may be formed by

the two end portions of the clamping band being rearwardly bent and riveted, soldered or welded to the outer circumference of the clamping band. This makes the construction of the clamping device expensive.

5 Therefore, the object of the invention is to provide a simple and inexpensive coupling device which eliminates the drawbacks inherent in prior-art clamping bands. Moreover, the invention aims at providing a coupling device having a good sealing effect.

10 According to the invention, these and other objects, which will appear from the description below, are now achieved by means of a device which is of the type mentioned by way of introduction and which besides has the features stated in the characterising clause of claim 1.

15 Owing to the cylindrically designed pockets at the ends of the clamping band and the cylindrical elements arranged therein, the clamping band is subjected mainly to tangential forces while being drawn together, since the two cylindrical elements have the possibility of
20 turning as the band is drawn together to a smaller diameter. In prior-art clamping bands of the type in which flanges are bent perpendicularly away from the bands, these flanges are, however, subjected to heavy stress during drawing together, since they are not perpendicular
25 to the direction of drawing together.

 The inventive clamping band has the additional advantage that it is easy to manufacture, since no riveting, soldering, welding or other fastening of the clamping parts is required, and that the used cylindrical elements and the screw can be of standard type and are
30 available on the market.

 The pockets, which are preferably formed in a simple bending operation, can be of, for instance, circular-cylindrical or square cross-section, and the corresponding
35 cylindrical elements can be of square and circular-cylindrical cross-section, respectively.

The device according to the invention has the advantage in respect of manufacturing technique that the two cylindrical elements can be readily inserted sideways into the respective pockets in the ends of the clamping band. The clamping band is preferably supplied with the cylindrical elements positioned in the pockets and the straining screw inserted through and in engagement with the holes in the cylindrical elements.

According to a preferred embodiment, both the pockets and the cylindrical elements are of circular-cylindrical cross-section. This results in the cylindrical elements having a larger engagement surface in the pocket such that the clamping force is distributed over a greater part of the inside of the pocket.

For preventing leakage in the joint between the pipe sections, the clamping band is, according to a preferred embodiment, fitted with an internal circumferential seal which preferably is made of rubber and which has two cross-sectionally cup-shaped portions for engaging the two beads of the pipe sections.

Further features of the invention are defined in the appended subclaims.

The invention will now be described in more detail below with reference to the accompanying drawing which illustrates various embodiments and in which

Fig. 1 shows a pipe coupling with a clamping band according to the invention seen in the direction of arrows I-I in Fig. 3,

Fig. 2 is a side view of an end of the clamping band in Fig. 1,

Fig. 3 is a side view of part of the clamping band, whose ends are prepared to be clamped, the pipes in the pipe coupling, however, being excluded for the sake of clearness,

Figs 3a and 3b illustrate two alternative embodiments of pockets and cylindrical elements,

Fig. 4 is a side view, on a smaller scale, of the entire coupling device, and

Fig. 5 is a view, corresponding to Fig. 1, of an embodiment with an internal seal on the clamping band.

5 Fig. 1 shows a coupling device according to the invention, comprising a clamping band 1 being of U-shaped cross-section and having two flanges 1a, 1b which here encompass two schematically illustrated pipe sections 10, 20 with circumferential end beads 11 and 21, respectively, which are formed by bending. The flanges 1a, 1b
10 diverge slightly in order to facilitate the mounting of the clamping band 1 on the beads 11, 21.

The clamping band 1 shown in Figs 1-3 has end portions 2 which are bent to partially circular shape, form
15 pockets and are each provided with an unthreaded hole 3 whose axis is substantially parallel to the tangent line of the clamping band 1 in the position concerned.

As best seen in Fig. 3, there is in one end portion 2 arranged a nut-shaped abutment in the form of a short
20 cylindrical element 4 having a transverse threaded hole 4a. In the other end portion there is arranged a further element, which is also in the shape of a short cylindrical element 5 but which has a transverse unthreaded hole 5a for a straining screw 6.

25 The components and parts 2-6 thus form a simple, but efficient clamping mechanism for displacing the end portions 2 of the clamping band 1 relative to each other, whereby the band 1 can be tightened and the desired clamping around the beads 11, 21 can be achieved.

30 As shown in Figs 3a and 3b, as variants, a cylindrical element of square cross-section can be arranged in a circular-cylindrical pocket, or a circular-cylindrical element can be arranged in a pocket of square cross-section. To accommodate the straining screw 6, the end portions
35 of the clamping band 1 are in this case fork-shaped at the free ends.

According to a preferred embodiment, the clamping band 1 has an internal circumferential seal 25, as shown in Fig. 5, consisting of a polymer, preferably rubber. The surface of the seal 25 facing the beads 11, 21 (Fig. 1) has two cup-shaped portions 26 for providing reliable abutment against the beads 11, 21. It will be appreciated that the seal may have other cross-sectional shapes as long as a satisfactory sealing function is achieved.

CLAIMS

1. A device for coupling pipe sections (10, 20)
5 which at the end have an outwardly directed bead (11, 21), said device comprising an annular clamping band (1) with two opposite, spaced-apart ends, and a clamping mechanism arranged at the ends of the clamping band (1) and adapted to tighten the band (1) around the end beads
10 (11, 21) of the pipe sections (10, 20), the clamping band (1) being of substantially U-shaped cross-section with two flanges (1a, 1b) for safely encompassing the end beads (11, 21), and each end of the clamping band (1) forming a substantially cylindrical pocket (2),
15 c h a r a c t e r i s e d in that said clamping mechanism comprises two cylindrical elements (4, 5) which are each arranged in a separate pocket (2) and whose greatest cross-sectional dimension is slightly smaller than the smallest internal cross-sectional dimension of said
20 pocket (2) and which are freely rotatable about their own axis inside said pocket, one cylindrical element (4) having a transverse threaded hole (4a), whereas the other cylindrical element (5) has a transverse unthreaded hole (5a), and a straining screw (6) extending freely through
25 the unthreaded hole (5a), through unthreaded holes (3) in the opposite ends of the clamping band (1) and finally being in threaded engagement with the threaded hole (4a).

2. The device as claimed in claim 1, wherein said pockets (2) and said cylindrical elements (4, 5) are of
30 circular-cylindrical cross-section.

3. The device as claimed in claim 1 or 2, wherein the clamping band (1) on its inside facing the beads (11, 21) of the pipe sections (10, 20) has a circumferential seal (25) for abutment against the beads (11, 21).

35 4. The device as claimed in claim 3, wherein the seal (25) consists of an elastic polymer, preferably rubber.

7 .

5. The device as claimed in claim 3 or 4, wherein the surface of said seal (25) facing the beads (11, 21) has two cup-shaped portions (26) for abutment against the respective beads (11, 21).

FIG. 1

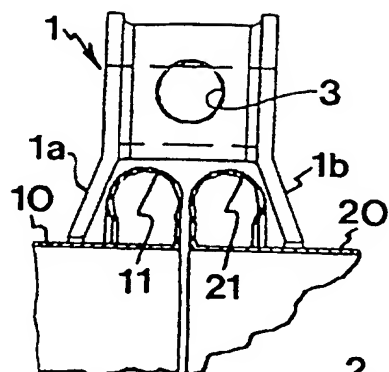


FIG. 2

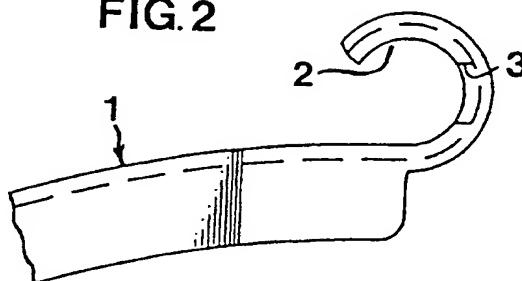


FIG. 3

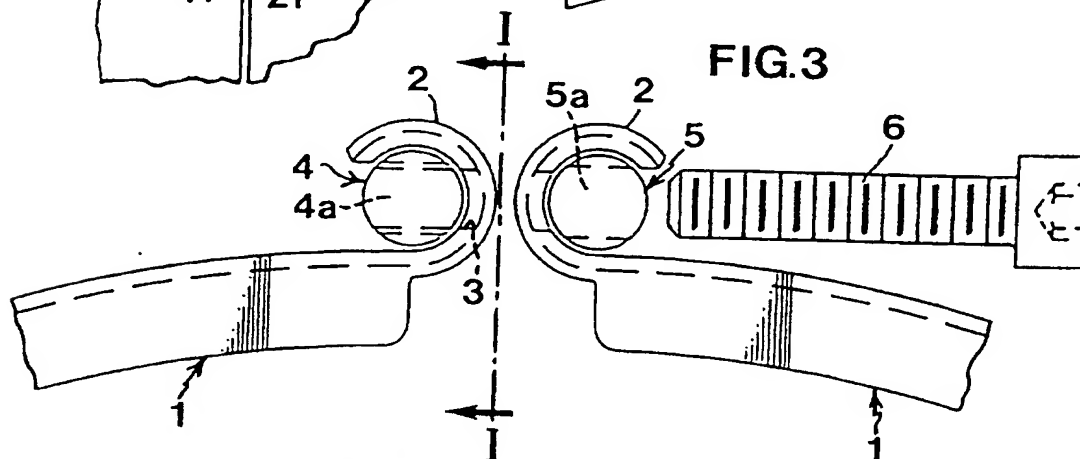


FIG. 3a

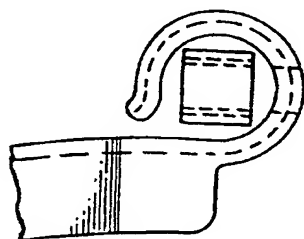


FIG. 3b

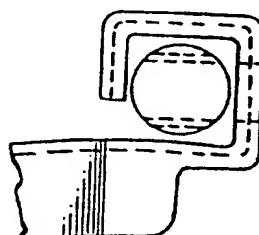


FIG. 4

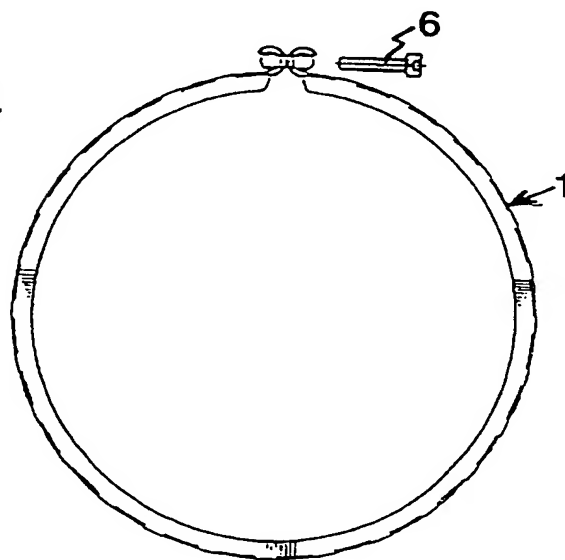
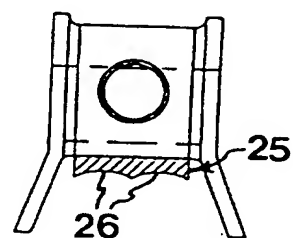


FIG. 5



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 95/01001

A. CLASSIFICATION OF SUBJECT MATTER		
IPC6: F16L 23/08 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC6: F16L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SE 466415 B (ABB ATOM AB), 10 February 1992 (10.02.92), figures 2-4, claims 1,2 --	1,2
X	US 3235293 A (H.F. CONDON), 15 February 1966 (15.02.66), figures 1-7 --	1-5
X	US 5137305 A (STRAUB), 11 August 1992 (11.08.92), figures 1,2 --	1,2
A	US 2426423 A (T.A. WOOLSEY), 26 August 1947 (26.08.47), column 2, line 44 - line 51, figure 3 --	5
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2699343 A (H. TROEGER ET AL), 11 January 1955 (11.01.55), figure 2 ----- --	1,2

INTERNATIONAL SEARCH REPORT
Information on patent family members

02/10/95

International application No.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
SE-B- 466415	10/02/92	DE-D, T- 69019149 EP-A, B- 0470201 SE-T3- 0470201 JP-T- 4504661 JP-B- 7034757 SE-A- 9000272	07/09/95 12/02/92 20/08/92 19/04/95 27/07/91
US-A- 3235293	15/02/66	NONE	
US-A- 5137305	11/08/92	AU-B, B- 627987 AU-A- 7285691 CA-C- 2038508 CH-A- 681318 DE-D- 59100676 EP-A, B- 0447955 SE-T3- 0447955 ES-T- 2047354 FI-B, C- 93767 JP-A- 5079588 KR-B- 9411854 RU-C- 2018764	03/09/92 26/09/91 23/08/94 26/02/93 00/00/00 25/09/91 16/02/94 15/02/95 30/03/93 27/12/94 30/08/94
US-A- 2426423	26/08/47	NONE	
US-A- 2699343	11/01/55	NONE	